

Unit 4: Quadrilaterals

Perimeter: add up all sides. You may need:

Pythagorean Theorem $a^2 + b^2 = c^2$ or

Distance Formula: $\sqrt{(x - x)^2 + (y - y)^2}$ to find the side lengths

Area of a rectangle or parallelogram: $A = bh$

Area of a triangle: $A = \frac{1}{2}bh$

Area of a trapezoid: $A = \frac{1}{2}(b_1 + b_2)$

Area of a kite or rhombus: $A = \frac{1}{2}d_1 \cdot d_2$

Quadrilateral	Basic definition/minimum to be called this shape	Additional properties
Parallelogram	A quadrilateral with opposite sides parallel (opposite sides will have the same slope)	opposite angles are congruent diagonals are bisected opposite sides are congruent
Rectangle	A quadrilateral with four right angles (sides will have opposite reciprocal slopes!)	Opposite sides are parallel and congruent Diagonals are congruent & bisected
Rhombus	A quadrilateral with four congruent sides	Opposite angles are congruent Opposite sides parallel Diagonals are perpendicular & bisected
Square	A quadrilateral with four right angles and four congruent sides	Diagonals are congruent Diagonals are bisected

UNIT 4: QUADRILATERALS

Practice

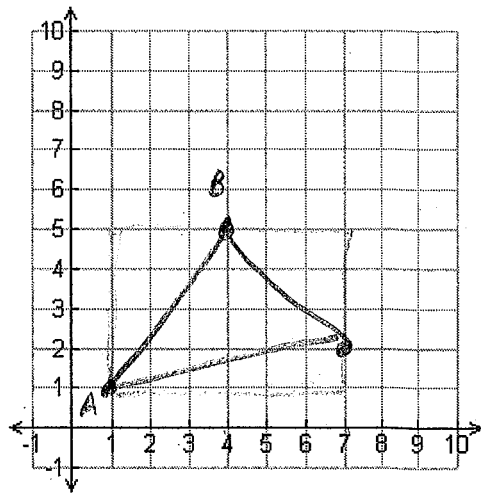
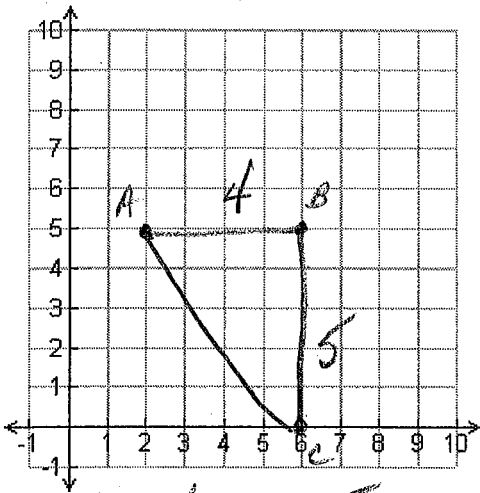
Name the shape based only on the information given:

- I have four right angles RECTANGLE
- The slopes of my adjacent sides are $\frac{3}{4}$ and $-\frac{4}{3}$ RECTANGLE
- I have four congruent sides RHOMBUS
- The lengths of all four of my sides are 5 units RHOMBUS
- My opposite sides are parallel PARALLELOGRAM
- I have four right angles and four congruent sides SQUARE

Find the area and the perimeter of each triangle:

7. A (2, 5) B (6, 5) C (6, 0)

8. A (1, 1) B (4, 5) C (7, 2)



AB 4 BC 5 AC $\sqrt{41}$

AB 5 BC $\sqrt{13}$ AC $\sqrt{37}$

P $9 + \sqrt{41}$ A 10
15.40312

P 15.3254 A 10.5

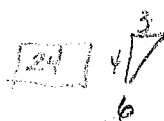
$\sqrt{16 + 25}$

$\sqrt{41}$

AB $\sqrt{3^2 + 4^2}$
 $\sqrt{9 + 16}$
 $\sqrt{25}$

BC $\sqrt{3^2 + 3^2}$
 $\sqrt{18}$

AC $\sqrt{6^2 + 12^2}$
 $\sqrt{36 + 144}$
 $\sqrt{180}$

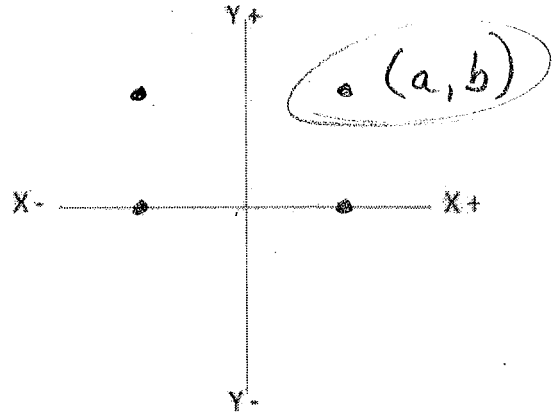
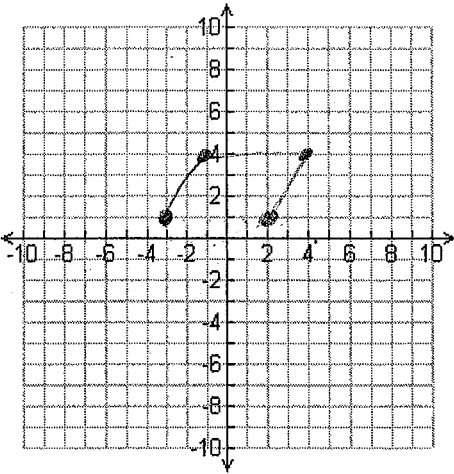


$24 - 9 = 15$
 $24 - 13.5 = 10.5$

Find the missing coordinate of each quadrilateral:

9. parallelogram: $(-3, 1)$ $(-1, 4)$ $(4, 4)$

10. Rectangle $(a, 0)$ $(-a, 0)$ $(-a, b)$



(2, 1)

(a, b)

11. Find the perimeter and the area of the parallelogram in #9

Top 5 Bottom 5 Left $\sqrt{13}$ Right $\sqrt{13}$

Perimeter $10 + 2\sqrt{13}$ Area 15
 17.2111

$$\sqrt{(-1+3)^2 + (4-1)^2}$$

$$\sqrt{4 + 9}$$

$$\sqrt{13}$$

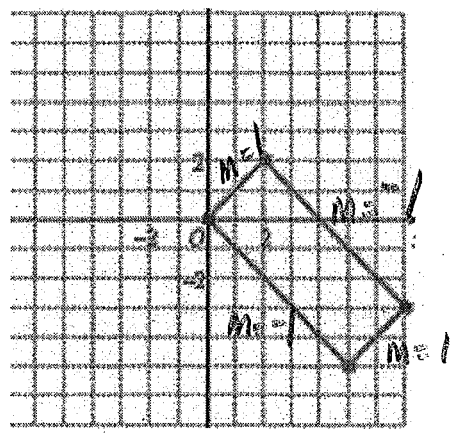
$$A = bh$$

$$= 5(3)$$

$$= 15$$

12. State the definition of a rectangle: 4 right \angle 's

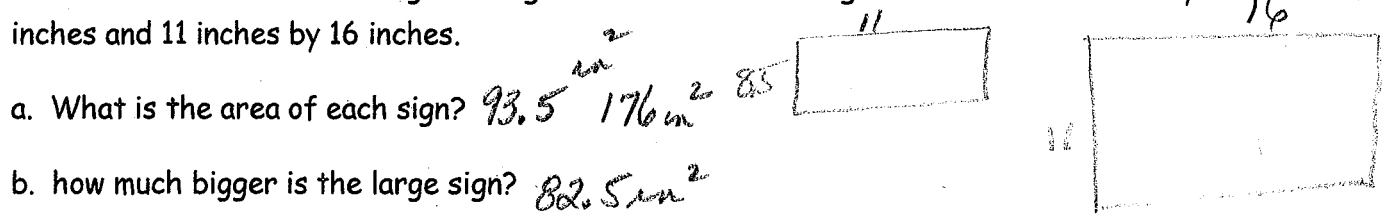
Prove or disprove that the quadrilateral is a rectangle: hint: slope = $\frac{\text{rise}}{\text{run}}$



slope = 1 slope = -1
 slope = 1 slope = -1

adjacent sides have \perp slopes
 \therefore 4 right \angle 's
 Rectangle

13. You start a SohCahToa sign making business. You have signs that are 8.5 inches by 11 inches and 11 inches by 16 inches.



- a. What is the area of each sign? 93.5 in^2 176 in^2
- b. how much bigger is the large sign? 82.5 in^2
- c. ink costs \$0.01 per square inch to print. How much does it cost to print the small sign?
- d. how much does it cost to print the large sign? \$1.76
- e. how much more expensive is the large sign?

$(93.5)(0.01) = .935$
 $\$0.94$

$1.76 - .935 = .825$
.83